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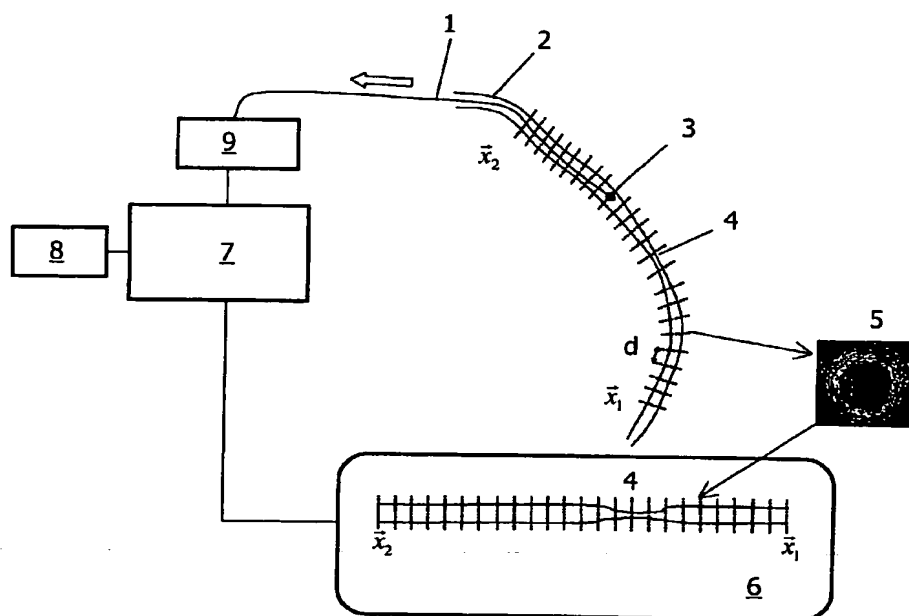
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(54) Title: APPARATUS AND METHOD FOR ASSISTING THE NAVIGATION OF A CATHETER IN A VESSEL



(57) Abstract: The invention relates to the assistance of the navigation of a catheter (1) in a vessel (2). A sequence of cross-sectional images of the portion of the vessel that is of interest is first obtained with the help of an intravascular ultrasound (IVUS) probe (3) and stored as a roadmap of the vessel. A cross-sectional image (10) that is obtained at the current position of the IVUS probe (3) can then be sorted to the position on the roadmap that is the best fit. A model (3') of the probe, and a model (11') of the instrument (a stent (11), for example) coupled to the probe, can be shown on a display (6) at the corresponding position on the roadmap.



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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/077546 A1 (BECKMANN FRIEDRICH-KARL ET AL) 20 June 2002 (2002-06-20) abstract paragraphs '0002!, '0009!, '0014! paragraphs '0016!, '0023!, '0026! paragraphs '0028!, '0029!, '0037! figure 1	1-10
X	EP 0 885 594 A (MEDINOL LTD) 23 December 1998 (1998-12-23) abstract figures 2A,4 page 2, line 15 - line 25 page 2, line 51 - line 55 page 6, line 2 - line 8 page 19, line 23 - page 20, line 10 figure 15 ----- -/--	1-10

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A	US 6 083 167 A (CROCKER IAN R ET AL) 4 July 2000 (2000-07-04) the whole document	1-10

INTERNATIONAL SEARCH REPORT

P03/05442

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2002077546	A1	20-06-2002	DE 10051244 A1	16-05-2002
			EP 1199031 A2	24-04-2002
			JP 2002200058 A	16-07-2002
EP 0885594	A	23-12-1998	US 5924990 A	20-07-1999
			AT 236574 T	15-04-2003
			AU 757314 B2	13-02-2003
			AU 7307498 A	14-01-1999
			AU 8032298 A	04-01-1999
			BR 9814778 A	26-06-2001
			CA 2240651 A1	19-12-1998
			CZ 9801901 A3	13-10-1999
			DE 19827460 A1	24-12-1998
			DE 69813087 D1	15-05-2003
			DE 69813087 T2	05-02-2004
			DK 885594 T3	14-07-2003
			EE 9800196 A	15-02-1999
			EP 1227342 A1	31-07-2002
			EP 0885594 A2	23-12-1998
			ES 2192290 T3	01-10-2003
			GB 2326479 A ,B	23-12-1998
			WO 9857580 A1	23-12-1998
			JP 11151246 A	08-06-1999
			NO 982817 A	21-12-1998
			PL 326831 A1	21-12-1998
			PT 885594 T	29-08-2003
			SG 68672 A1	16-11-1999
			SK 87098 A3	14-02-2000
			US 6152878 A	28-11-2000
			US 6095976 A	01-08-2000
US 6083167	A	04-07-2000	AU 747079 B2	09-05-2002
			AU 2579399 A	23-08-1999
			CA 2319580 A1	12-08-1999
			EP 1054616 A1	29-11-2000
			WO 9939628 A1	12-08-1999
			US 6273858 B1	14-08-2001

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US 2002077546	A1	20-06-2002	DE	10051244 A1	16-05-2002
			EP	1199031 A2	24-04-2002
			JP	2002200058 A	16-07-2002
EP 0885594	A	23-12-1998	US	5924990 A	20-07-1999
			AT	236574 T	15-04-2003
			AU	757314 B2	13-02-2003
			AU	7307498 A	14-01-1999
			AU	8032298 A	04-01-1999
			BR	9814778 A	26-06-2001
			CA	2240651 A1	19-12-1998
			CZ	9801901 A3	13-10-1999
			DE	19827460 A1	24-12-1998
			DE	69813087 D1	15-05-2003
			DE	69813087 T2	05-02-2004
			DK	885594 T3	14-07-2003
			EE	9800196 A	15-02-1999
			EP	1227342 A1	31-07-2002
			EP	0885594 A2	23-12-1998
			ES	2192290 T3	01-10-2003
			GB	2326479 A , B	23-12-1998
			WO	9857580 A1	23-12-1998
			JP	11151246 A	08-06-1999
			NO	982817 A	21-12-1998
			PL	326831 A1	21-12-1998
			PT	885594 T	29-08-2003
			SG	68672 A1	16-11-1999
			SK	87098 A3	14-02-2000
			US	6152878 A	28-11-2000
			US	6095976 A	01-08-2000
US 6083167	A	04-07-2000	AU	747079 B2	09-05-2002
			AU	2579399 A	23-08-1999
			CA	2319580 A1	12-08-1999
			EP	1054616 A1	29-11-2000
			WO	9939628 A1	12-08-1999
			US	6273858 B1	14-08-2001